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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,358	03/10/2004	Mei-Yuh Hwang	M61.12-0633	4338

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EXAMINER	
JACKSON, JAKIEDA R	

ART UNIT	PAPER NUMBER
2626	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/797,358	HWANG ET AL.	
	Examiner	Art Unit	
	JAKIEDA R. JACKSON	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 August 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In response to the Office Action mailed May 19, 2008, applicant submitted an amendment filed on August 19, 2008, in which the applicant amended claims and requested reconsideration.

Response to Arguments

2. Applicant's argues that Griniasty does not teach in a dictionary comprising segmentations of words into sequences of graphoneme units, replacing the first and second graphoneme units with the larger graphoneme unit in each sequence of graphoneme units in which the first graphoneme unit appears immediately after the second graphoneme units, updating a segmentation of a word comprising a set of graphoneme units for the word that includes the pair of graphoneme units by replacing the pair of graphoneme units in the segmentation with the new graphoneme unit, segmenting a set of words into phonetic syllables using mutual information scores wherein using a mutual information score comprises computing a mutual information score for two phones by dividing the probability of two phones appearing next to each other in the set of words by the unigram probabilities of each of the two phones appearing in the set of words and segmenting a set of words into morphemes using mutual information scores wherein using mutual information scores comprises computing a mutual information score for two letters based on the probability of the two letters appearing next to each other in the set of words and the unigram probabilities of

each of the two letters appearing in the set of words. Applicant's arguments are persuasive, but are moot in view of new grounds of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 1-15 and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Griniasty (PGPUB 2003/0088416) in view of Lawrence (PGPUB 2003/0049588).

Regarding **claim 1**, Griniasty discloses a method of segmenting words into component parts, the method comprising:

determining mutual information scores for graphoneme units, each graphoneme unit comprising at least one letter in the spelling of a word (determining a score for characterizing the statistical connection between letters and phonemes; paragraphs 0012-0016);

using the mutual information scores to combine graphoneme units into a larger graphoneme unit (summing the scores; paragraphs 0016-0017); and

segmenting words into component parts to form a sequence of graphonemes (segmentation; paragraphs 0014-0015), but does not specifically teach in a dictionary comprising segmentations of words into sequences of graphoneme units, replacing the first and second graphoneme units with the larger graphoneme unit in each sequence of

graphoneme units in which the first graphoneme uniit appears immediately after the second graphoneme units.

Lawwrence discloses a method comprising segmentations of words into sequences of graphoneme units (word split into clusters of letter; paragraph 0014), replacing the first and second graphoneme units with the larger graphoneme unit in each sequence of graphoneme units in which the first graphoneme uniit appears immediately after the second graphoneme unit (cluster; paragraphs 0014-0024 and 0037), to divide pronunciation into a plurality of phonemes.

Therefore, it would have been obvious to one of ordinary skill of the art at the time the invention was made to modify Griniasty's method as described above, to generate words with new spelling not to be found in a dictionary that are pronounced the same as words found in a dictionary (paragraph 0002) ,as taught by Lawrence.

Regarding **claim 2**, Griniasty discloses a method wherein combining graphonemes comprises combining the letters of each graphoneme to produce a sequence of letters for the larger graphoneme unit and combining the phones of each graphoneme to produce a sequence of phones for the larger graphoneme unit ("L, OW"; paragraphs 0012 and 0016-0017).

Regarding **claim 3**, Griniasty discloses a method further comprising using the segmented words to generate a model (HMM; paragraph 0009).

Regarding **claim 4**, Griniasty discloses a method wherein the model describes the probability of a graphoneme unit given a context within a word (phoneme pair; paragraphs 0016-0017).

Regarding **claim 5**, Griniasty discloses a method further comprising using the model to determine a pronunciation of a word given the spelling of the word (phonemes that make up the spoken word; paragraph 0010).

Regarding **claim 6**, Griniasty discloses a method wherein using the mutual information scores comprises summing at least two mutual information scores determined for a single larger graphoneme unit to form a strength (higher score; paragraphs 0016-0017).

Regarding **claim 7**, Griniasty discloses a computer-readable medium having computer-executable instructions (implemented in software for execution within a computer; paragraph 0013, with the computer memory which is inherent in a computer system reading on the claimed "medium") for performing steps comprising:

determining mutual information scores for pairs of graphoneme units found in a set of words, each graphoneme unit comprising at least one letter (letters; paragraphs 0012-0015);

combining the graphoneme units of one pair of graphonome units to form a new graphoneme unit based on the mutual information scores ("L, OW"; paragraphs 0013-0017); and

identifying a set of graphoneme units for a word based in part on the new graphoneme unit (phoneme pair; paragraphs 0013-0014, but does not specifically teach updating a segmentation of a word comprising a set of graphoneme units for the word that includes the pair of graphoneme units by replacing the pair of graphoneme units in the segmentation with the new graphoneme unit,

Lawrence teaches a method of updating a segmentation of a word (word split into clusters of letter; paragraph 0014) comprising a set of graphoneme units for the word that includes the pair of graphoneme units by replacing the pair of graphoneme units in the segmentation with the new graphoneme unit (cluster; paragraphs 0014-0024 and 0037), to divide pronunciation into a plurality of phonemes.

Therefore, it would have been obvious to one of ordinary skill of the art at the time the invention was made to modify Griniasty's method as described above, to generate words with new spelling not to be found in a dictionary that are pronounced the same as words found in a dictionary (paragraph 0002) ,as taught by Lawrence.

Regarding **claim 8**, Griniasty discloses a computer-readable medium wherein combining the graphoneme units comprises combining the letters (letters) of the graphoneme units to form a sequence of letters for the new graphoneme unit (series of letters; paragraph 0010).

Regarding **claim 9**, Griniasty discloses a computer-readable medium wherein combining (arrange) the graphoneme units further comprises combining the phones of the graphoneme units to form a sequence (series) of phones for the new gaphoneme unit (paragraph 0010).

Regarding **claim 10**, Griniasty discloses a computer-readable medium further comprising identifying a set of graphonemes for each word in a dictionary (phonetic dictionary; paragraph 0011).

Regarding **claim 11**, Griniasty discloses a computer-readable medium further comprising using the sets of graphonemes identified for the words in the dictionary to train a model (train model; paragraphs 0009-0012).

Regarding **claim 12**, Griniasty discloses a computer-readable medium wherein the model describes the probability of a graphoneme unit appearing in a word (phoneme pair; paragraphs 0012-0017).

Regarding **claim 13**, Griniasty discloses a computer-readable medium wherein the probability is based on at least one other graphoneme unit in the word (phoneme pair; paragraphs 0012-0017).

Regarding **claim 14**, Griniasty discloses a computer-readable medium further comprising using the model to determine a pronunciation for a word given the spelling of the word (phonemes that make up the spoken word; paragraphs 0010 and 0023).

Regarding **claim 15**, Griniasty discloses a computer-readable medium wherein combining graphoneme units based on the mutual information score comprises summing at least two mutual information scores associated with a new graphoneme unit (summing scores; paragraphs 0016-0017).

Regarding **claim 17**, Griniasty discloses a method of segmenting a word into morphemes, the method comprising:

segmenting a set of words into morphemes using mutual information scores (segmentation of phonemes; paragraphs 0012-0017);

using the segmented set of words to train a morpheme n-gram model (train model; paragraphs 0009-0012); and

using the morpheme n-gram model to segment a word into morphemes via forced alignment (phoneme segmentation; paragraphs 0012-0017), but does not specifically teach segmenting a set of words into morphemes using mutual information scores wherein using mutual information scores comprises computing a mutual information score for two letters based on the probability of the two letters appearing next to each other in the set of words and the unigram probabilities of each of the two letters appearing in the set of words.

Lawrence discloses a method comprising segmenting a set of words into morphemes using mutual information scores wherein using mutual information scores comprises computing a mutual information score for two letters (letters) based on the probability of the two letters appearing next to each other in the set of words and the unigram probabilities of each of the two letters appearing in the set of words (paragraphs 0014-0028 ad 0037), to divide pronunciation into a plurality of phonemes.

Therefore, it would have been obvious to one of ordinary skill of the art at the time the invention was made to modify Griniasty's method as described above, to generate words with new spelling not to be found in a dictionary that are pronounced the same as words found in a dictionary (paragraph 0002) ,as taught by Lawrence.

5. **Claim 16** is rejected under 35 U.S.C. 103(a) as being unpatentable over Griniasty (PGPUB 2003/0088416) in view of Iizuka (PGPUB 2001/0009009).

Regarding **claim 16**, Griniasty discloses a method of segmenting a word into syllables, the method comprising:

segmenting a set of words into phonetic syllables (phoneme segmentation) using mutual information scores (scores; paragraphs 0012-0017);

using the segmented set of words to train a syllable n-gram model (HMM; paragraph 0009-0011); and

using the syllable n-gram model to segment a phonetic representation of a word into syllables via forced alignment (phonemes that make up the spoke word; paragraphs 0010 and 0023), but does not specifically teach segmenting a set of words into phonetic syllables using mutual information scores wherein using a mutual information score comprises computing a mutual information score for two phones by dividing the probability of two phones appearing next to each other in the set of words by the unigram probabilities of each of the two phones appearing in the set of words.

Although Iizuka does not specifically teach the exact division, paragraphs 0018, 0143, and equations 3, 4 and 6 are obvious variants, to provide a method of character string dividing or segmenting.

Therefore, it would have been obvious to one of ordinary skill of the art at the time the invention was made to modify Griniasty's method as described above, for efficiently dividing or segmenting an objective character string, for a natural language processing system (paragraph 0001), as taught by Iizuka.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAKIEDA R. JACKSON whose telephone number is

(571)272-7619. The examiner can normally be reached on Monday-Friday from 5:30am-2:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on 571-272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jakieda R Jackson/
Examiner, Art Unit 2626
November 14, 2008

/David R Hudspeth/
Supervisory Patent Examiner, Art Unit 2626